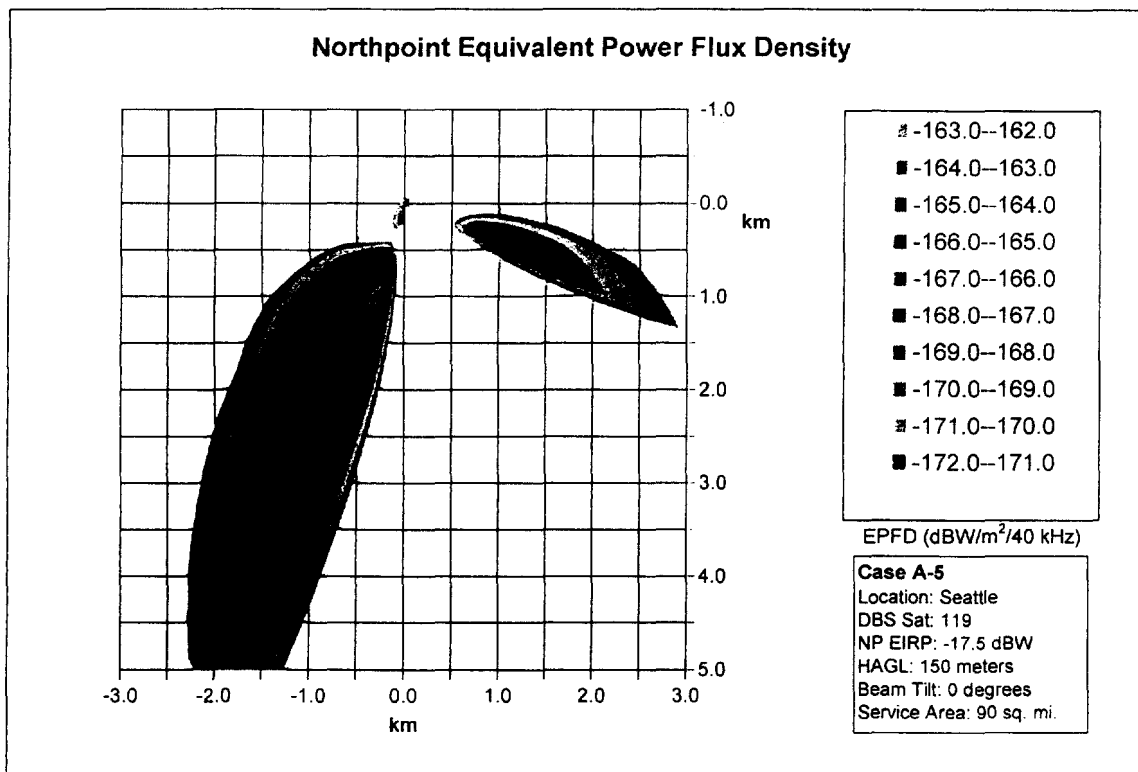
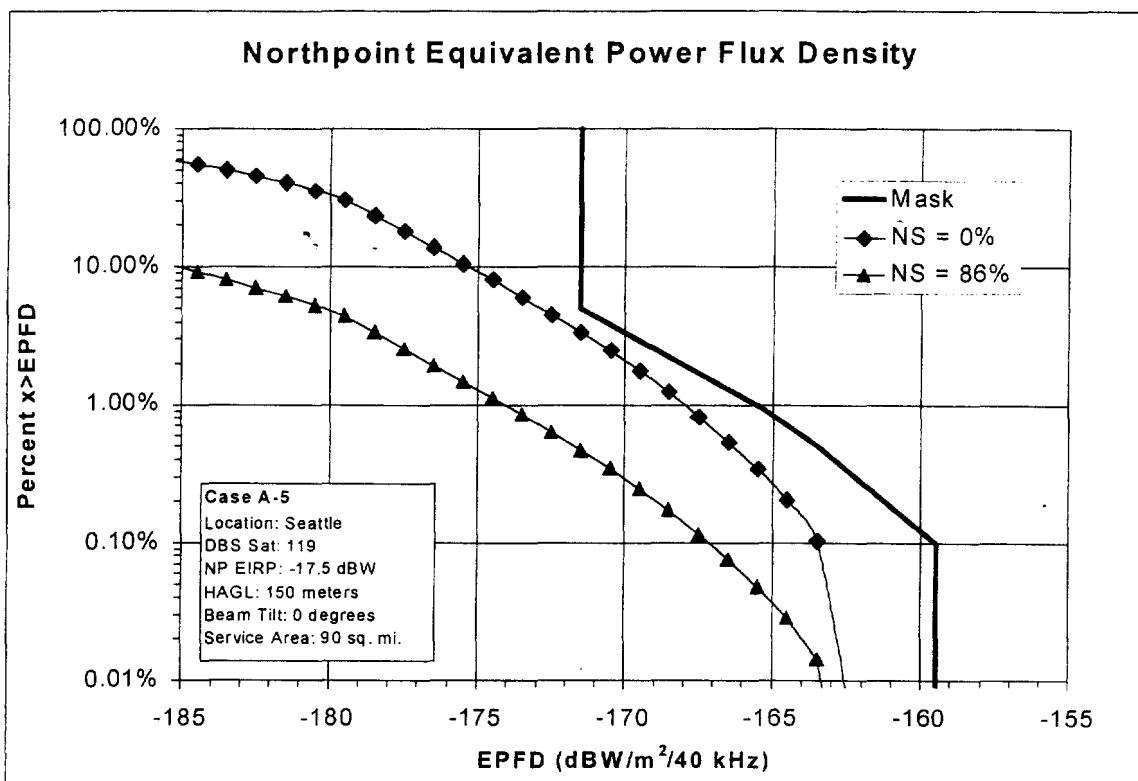
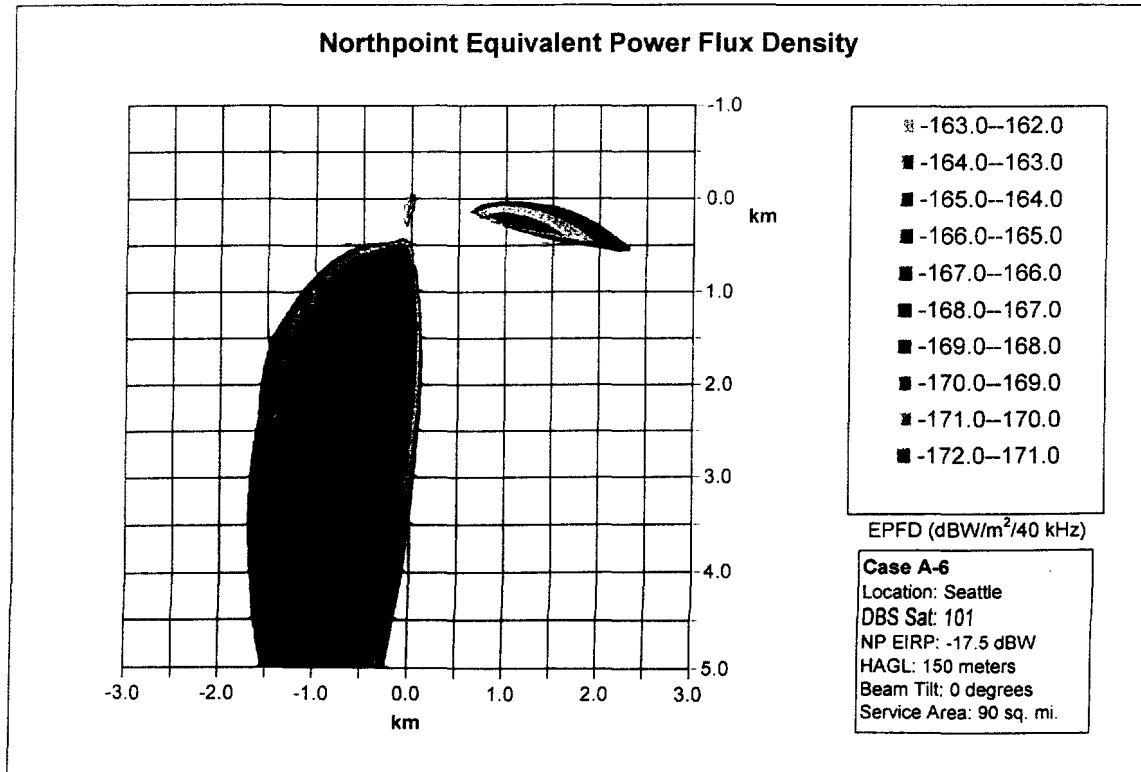
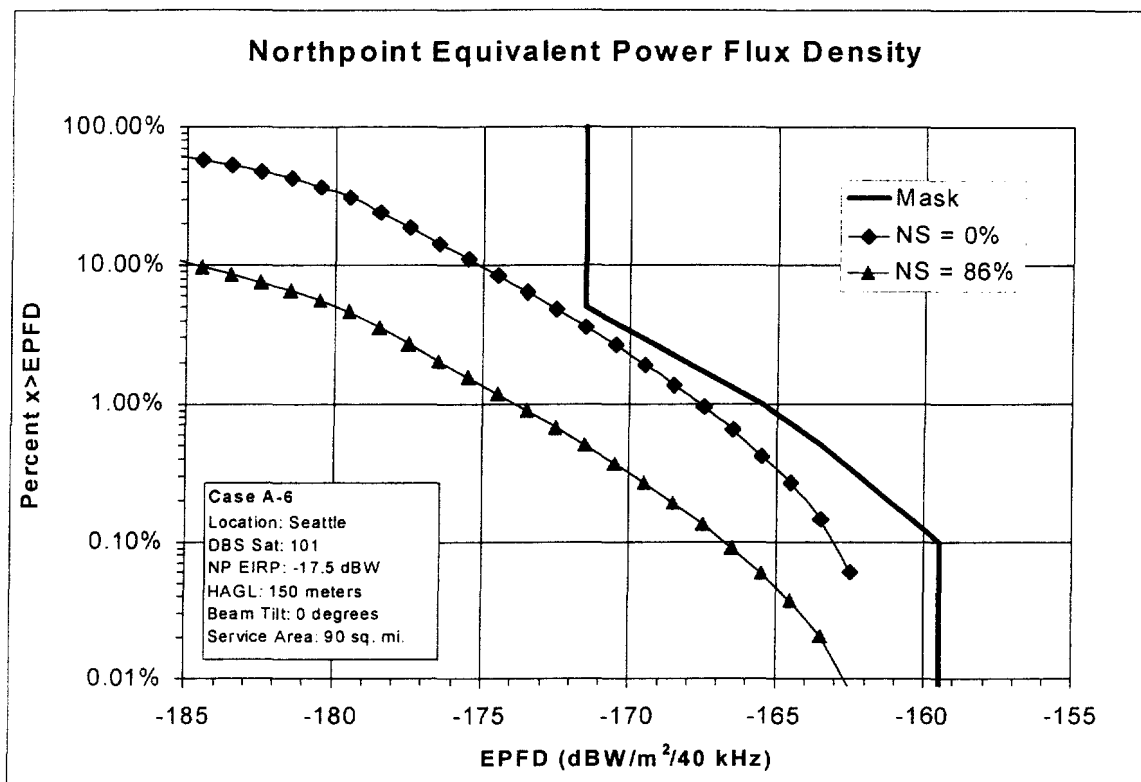


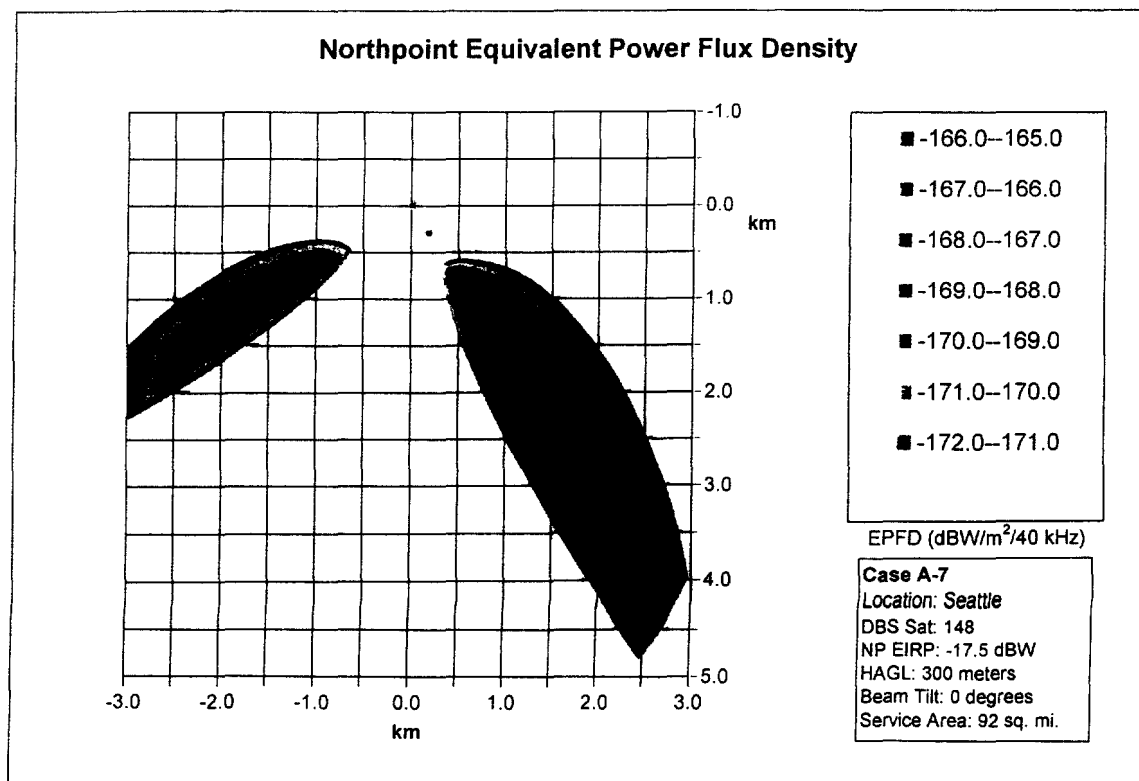
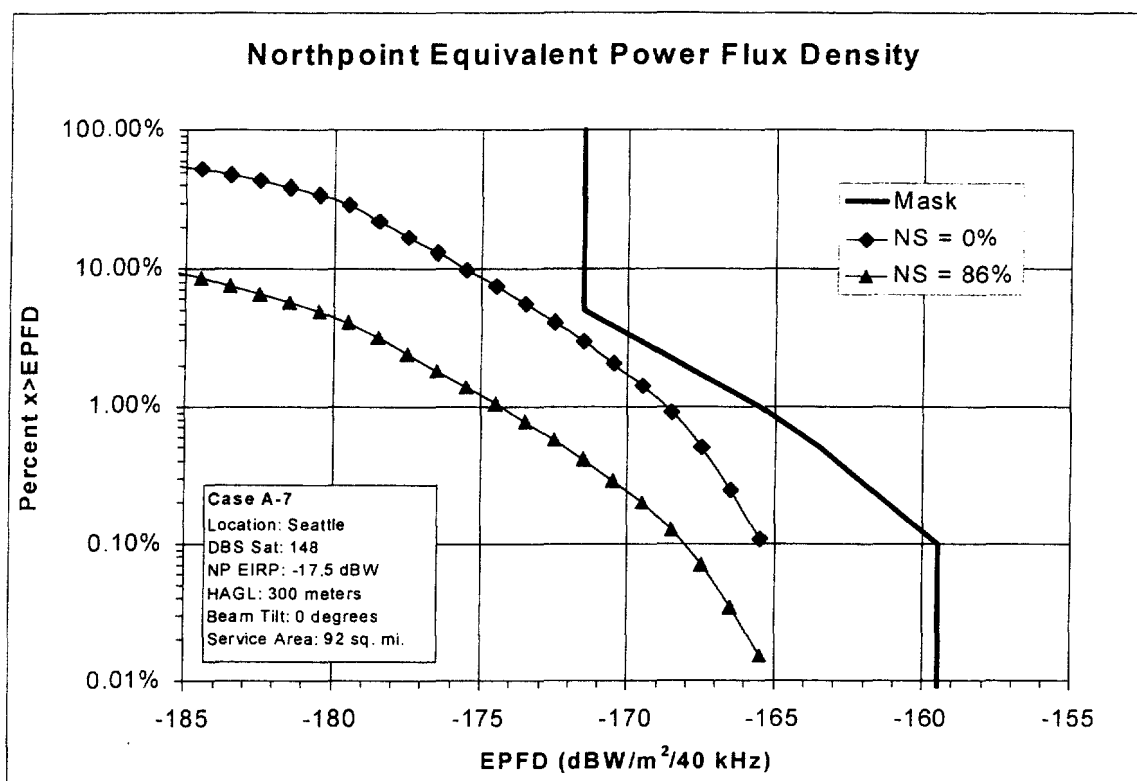
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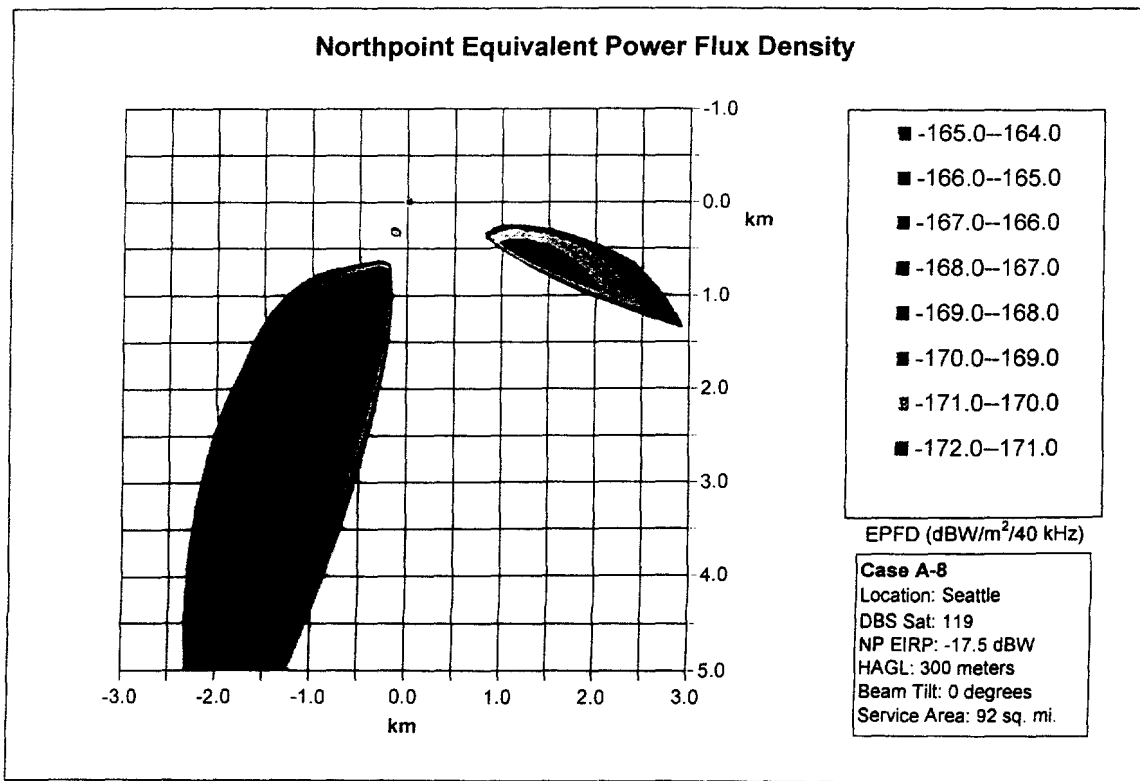
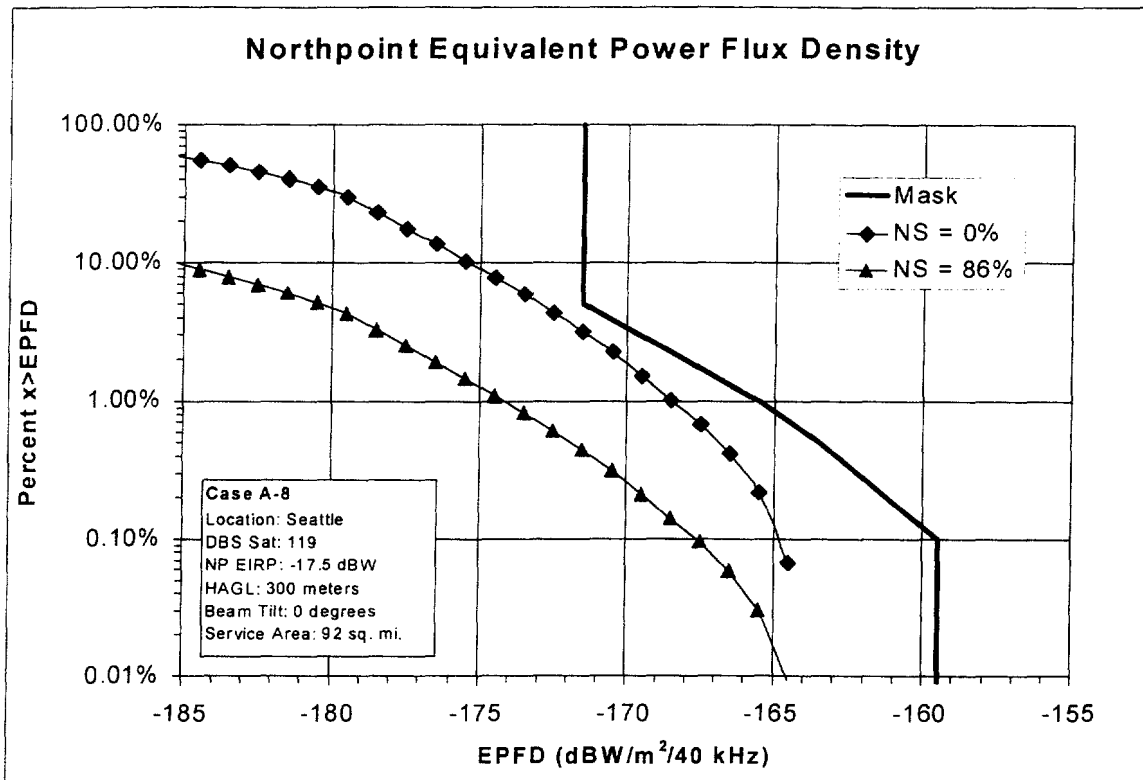
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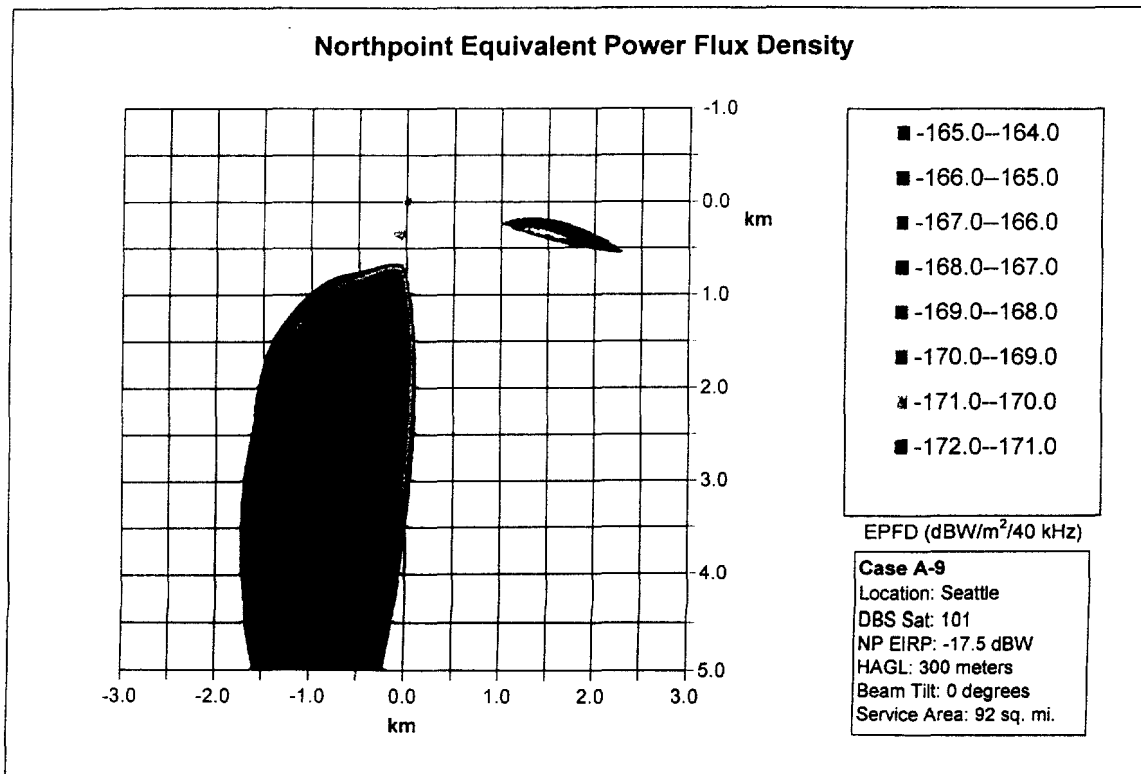
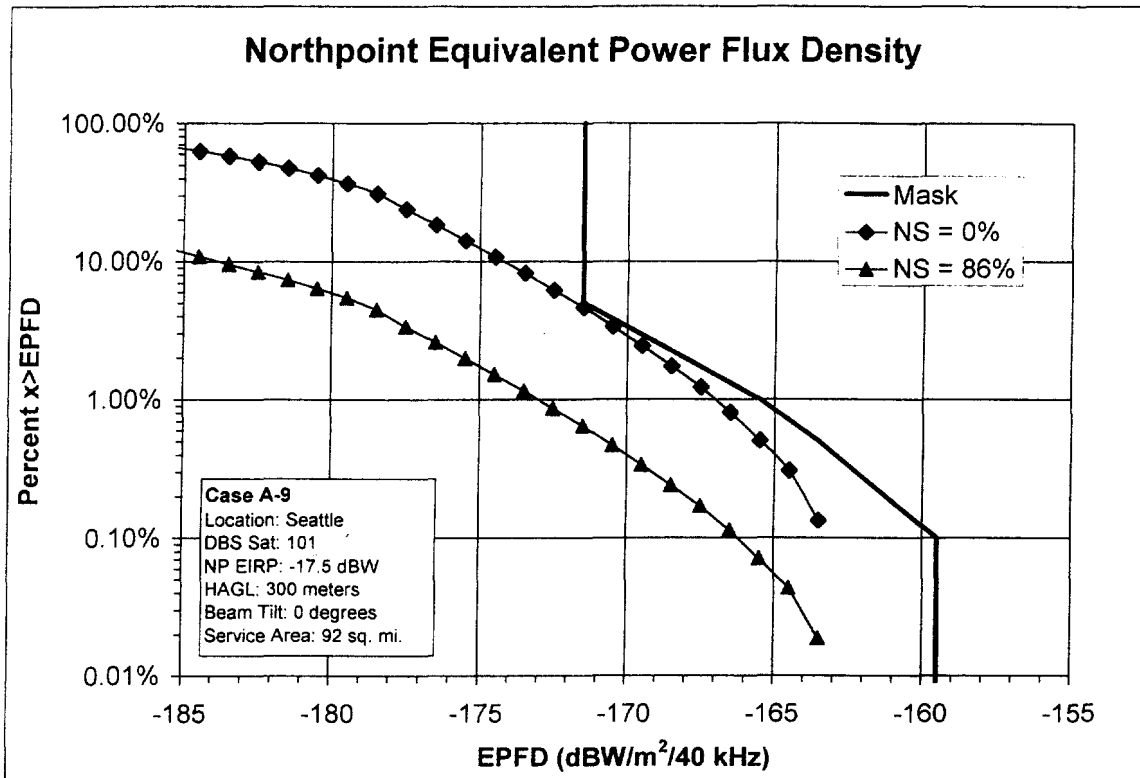
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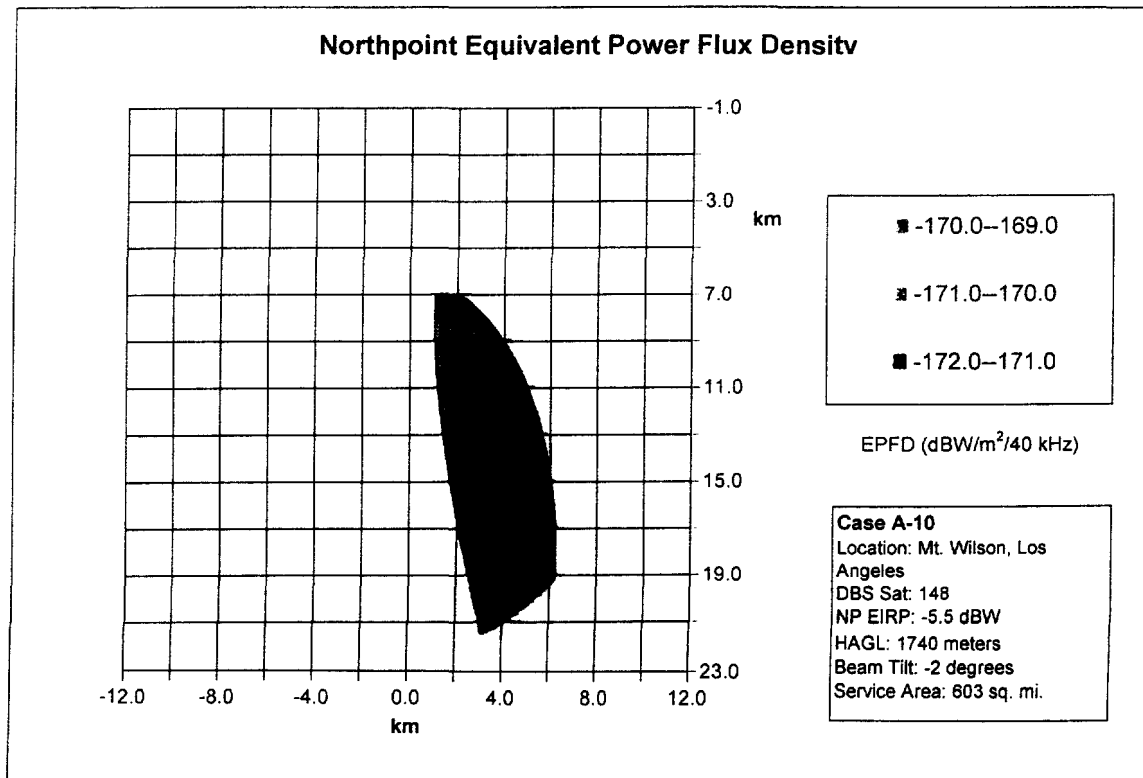
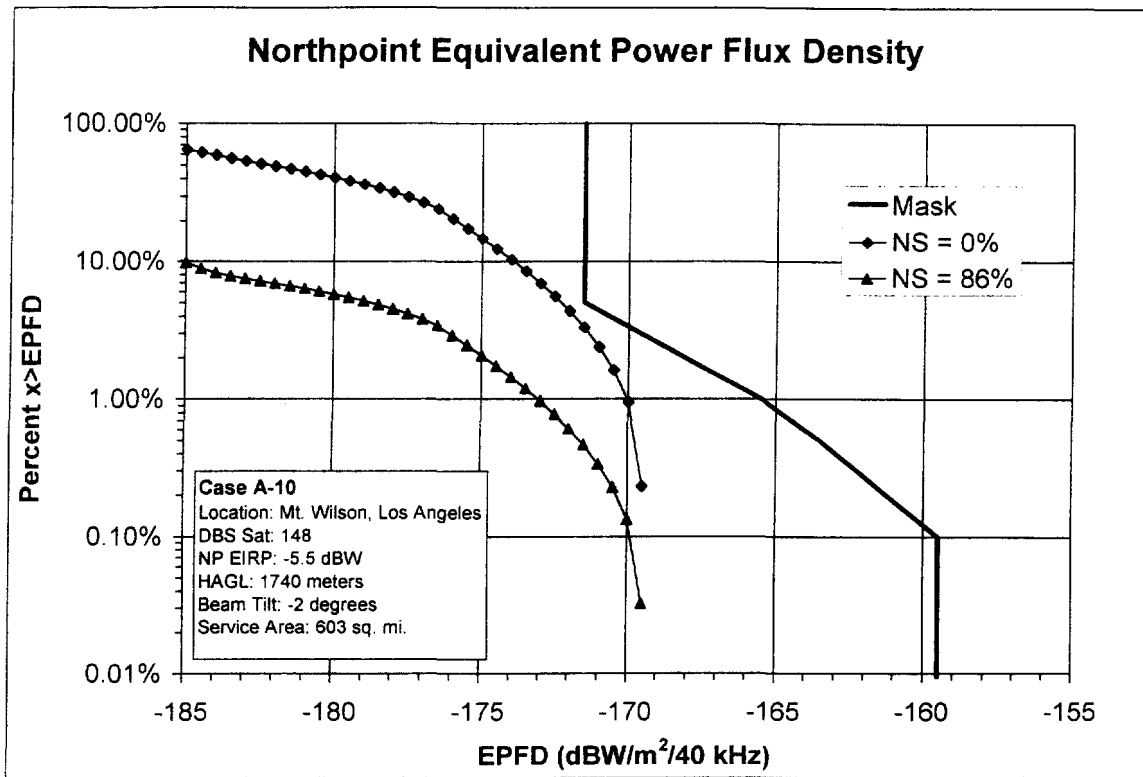
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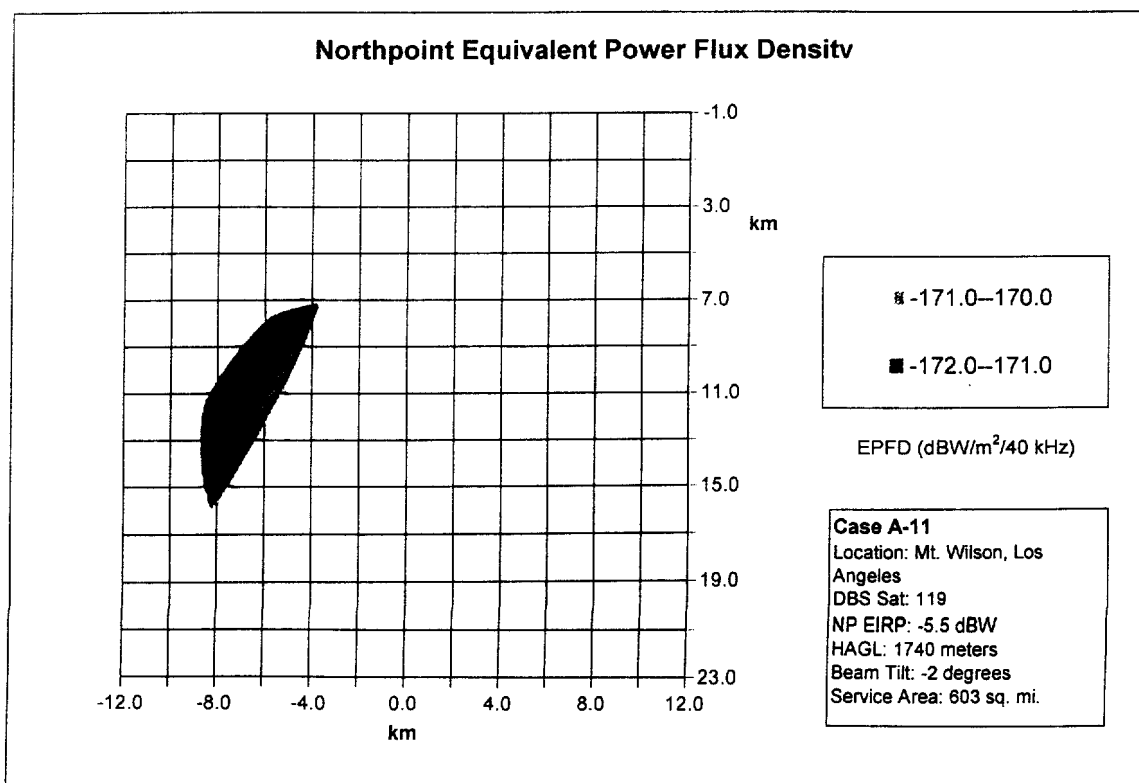
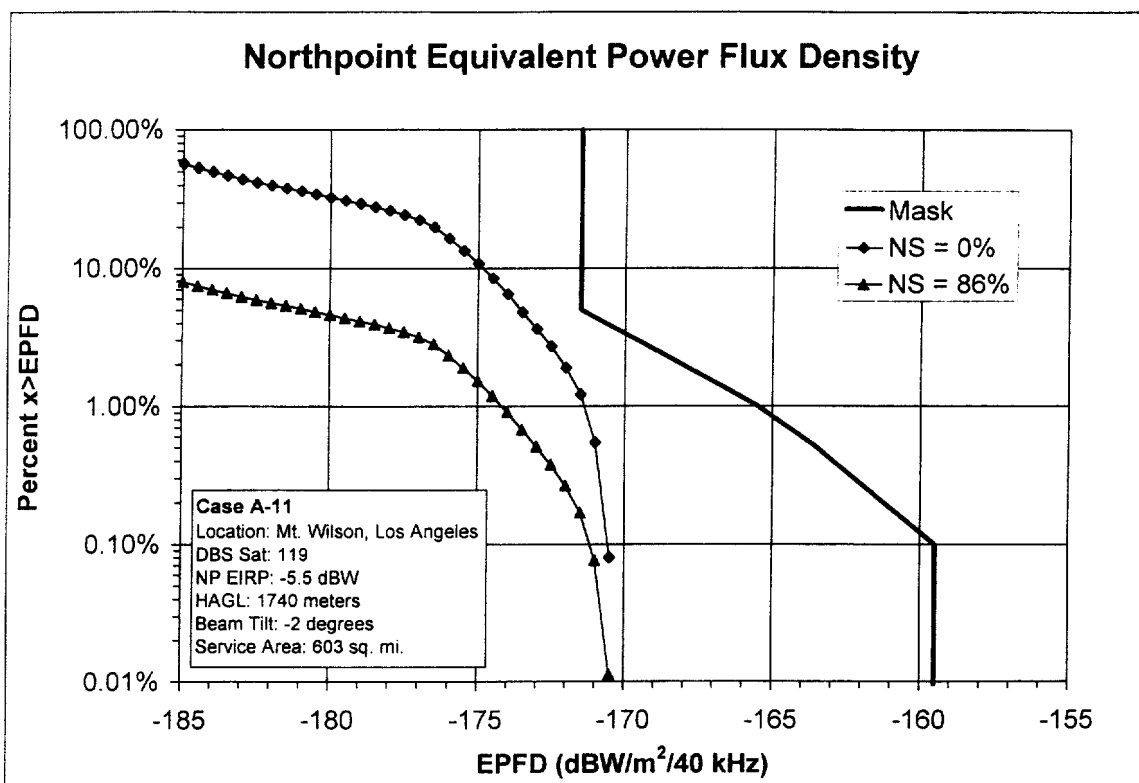
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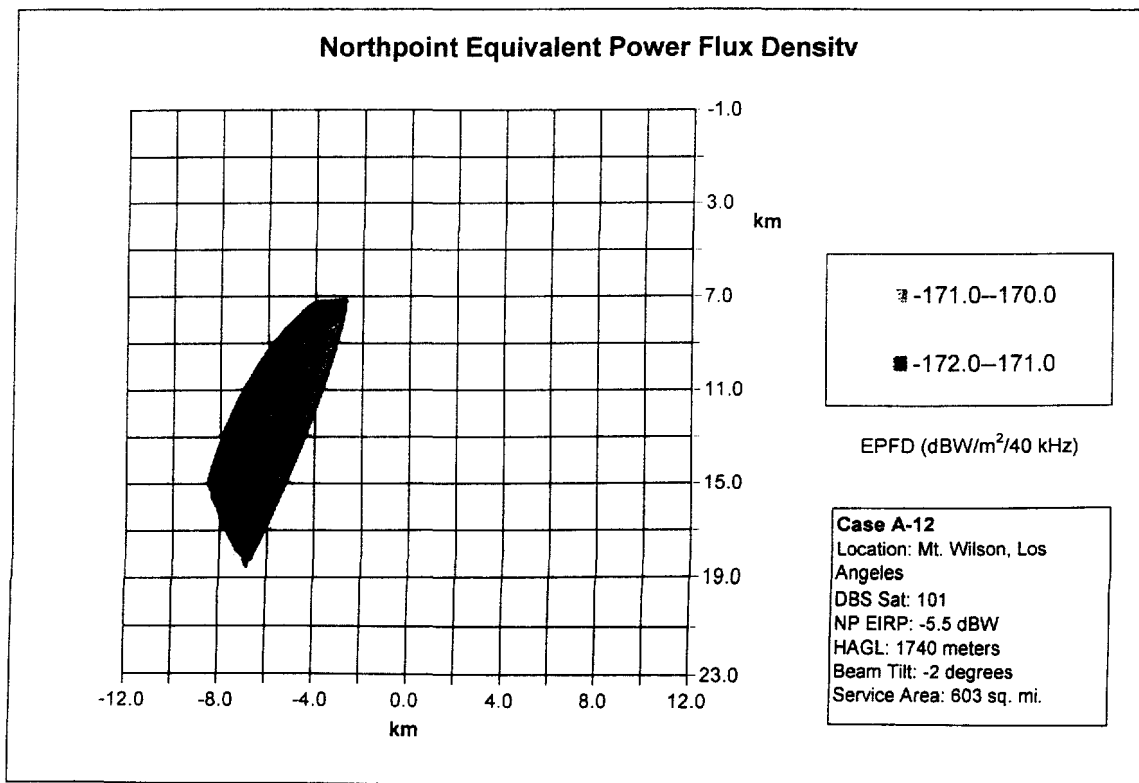
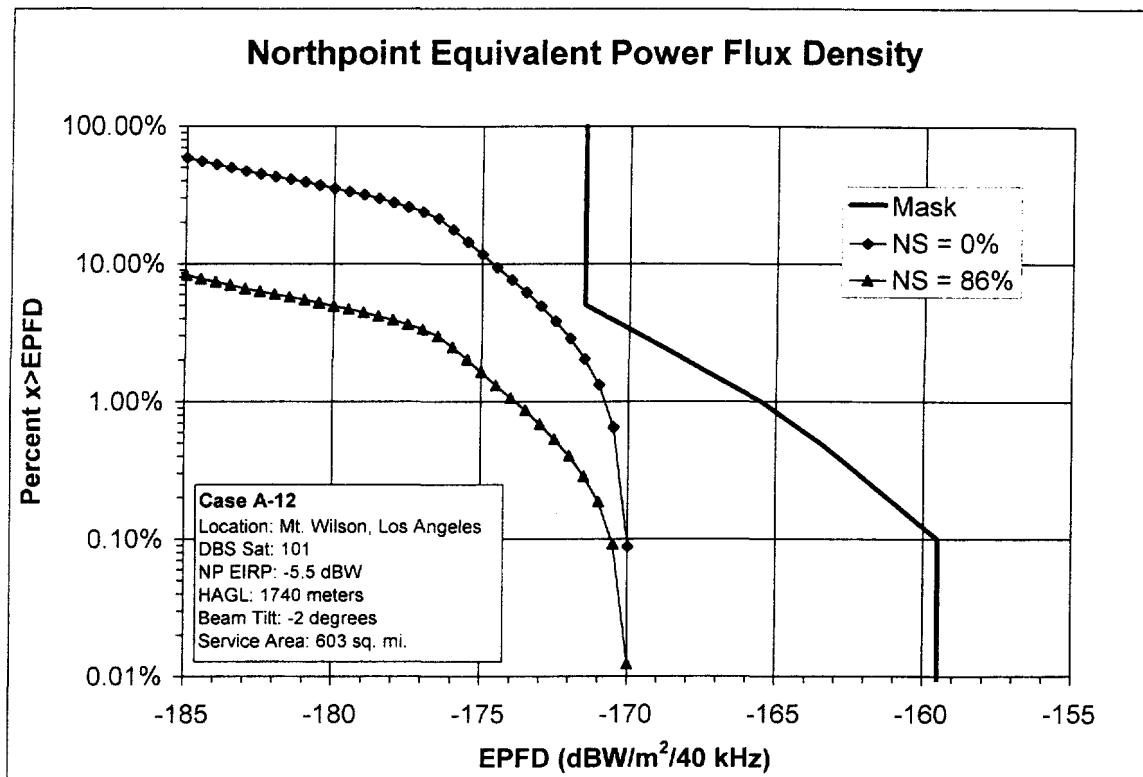
# Appendix 1



# Appendix I



# Appendix 1



## Appendix 2

This appendix contains the plots of example deployments in Florida; the input assumptions are listed in Table 1. Two types of figures are shown in this appendix.

- Plotted on the first figure are two sets of data, along with the EPFD mask. The data sets are for two different assumptions regarding the level of natural shielding (obstructions such as a structure, fence, or tree which afford DBS receive antennas protection from Northpoint interference). The first data set, labeled 'NS = 0%', assumes that there is no natural shielding. This is the most conservative assumption. The second data set is labeled 'NS = 86%', and this data assumes that 86% of DBS receive antennas have 15 dB of natural shielding.<sup>1</sup> This is the more realistic assumption.
- The second figure on each page shows, in an area near the Northpoint transmitter, the forecast equivalent power flux density, without any natural shielding.

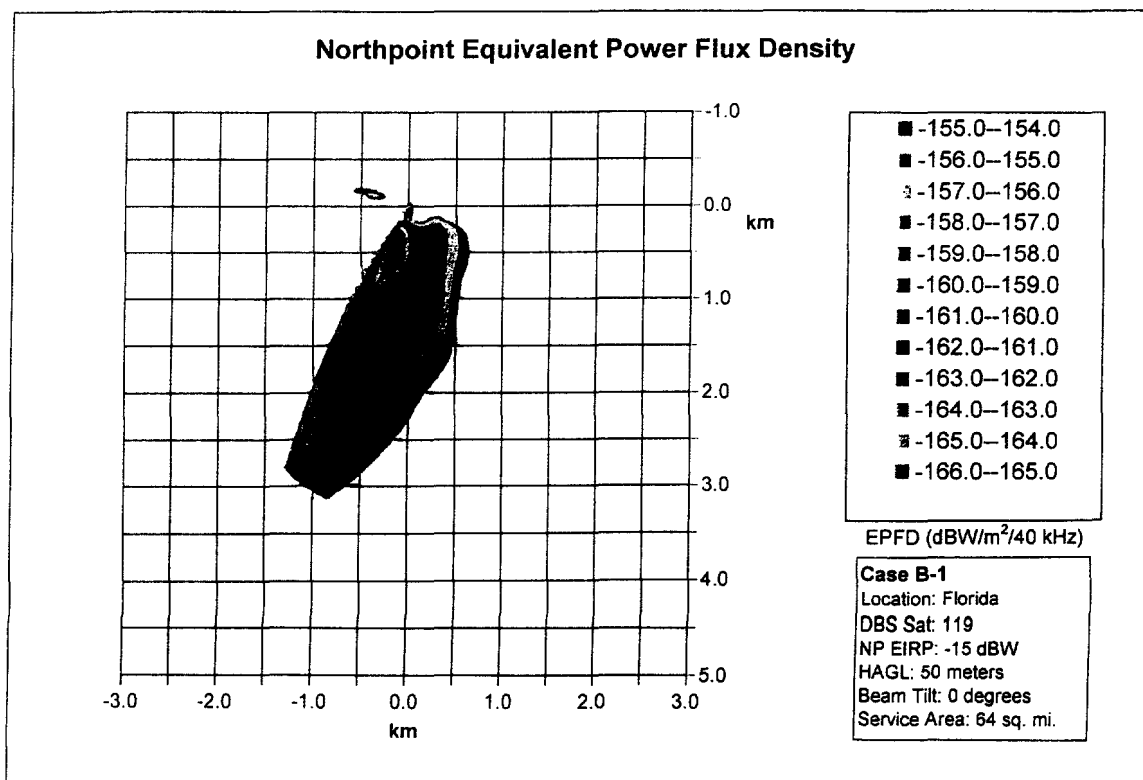
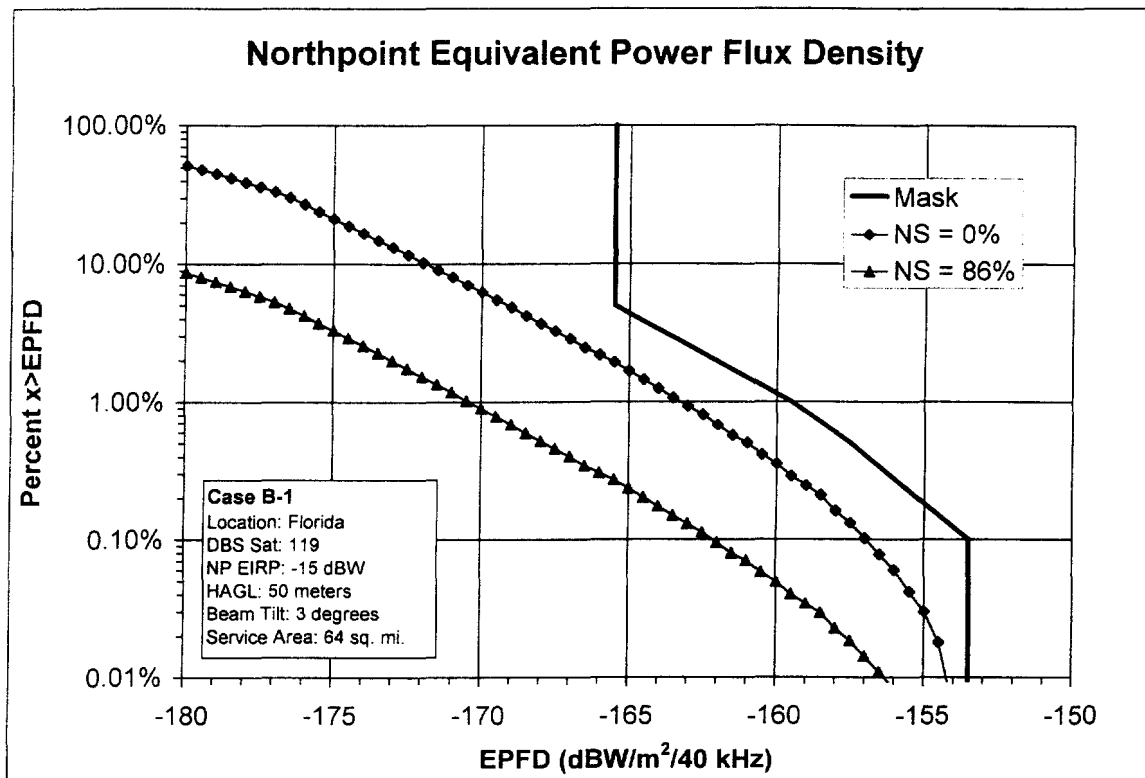
**Table 1. Example Northpoint deployments in Florida.**

Case	B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8	B-9	
DBS Satellite	119	101	61.5	119	101	61.5	119	101	61.5	West Longitude
Northpoint EIRP	-15	-15	-15	-14.5	-14.5	-14.5	-14.5	-14.5	-14.5	dBW/27 MHz
Northpoint Antenna Height	50	50	50	150	150	150	300	300	300	meters
Beam Tilt	3	3	3	0	0	0	0	0	0	degrees
Northpoint Service Area	64	64	64	90	90	90	92	92	92	Square Miles

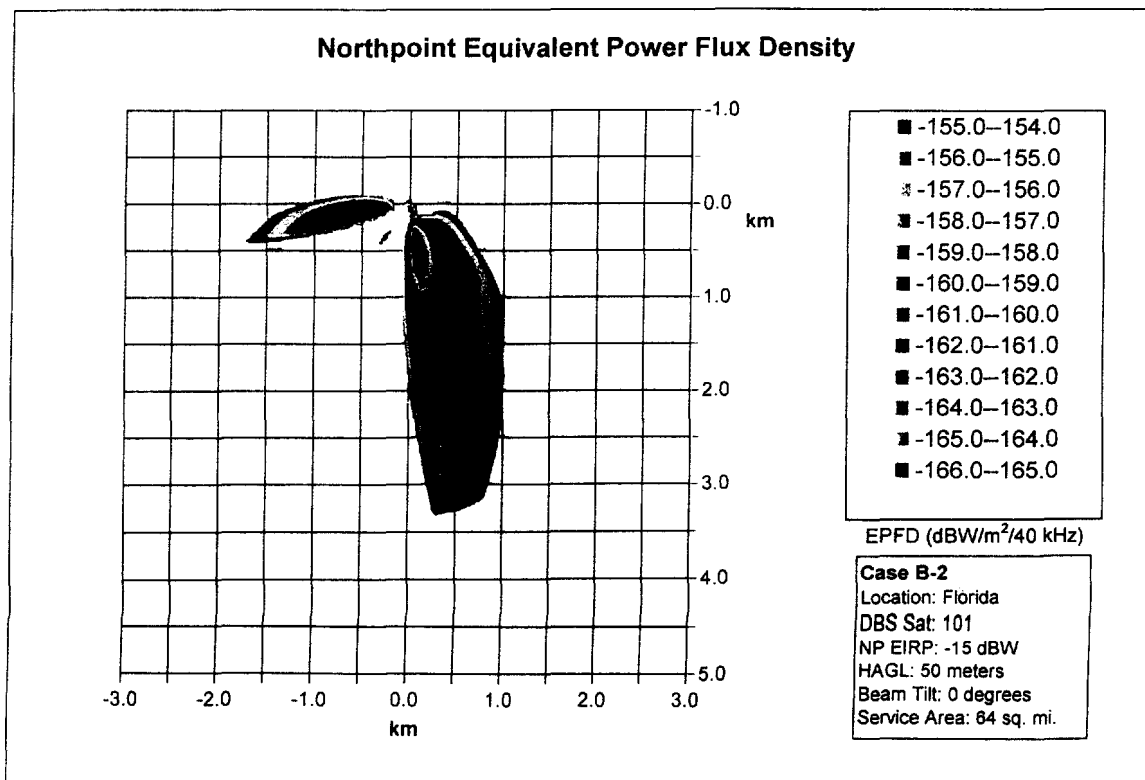
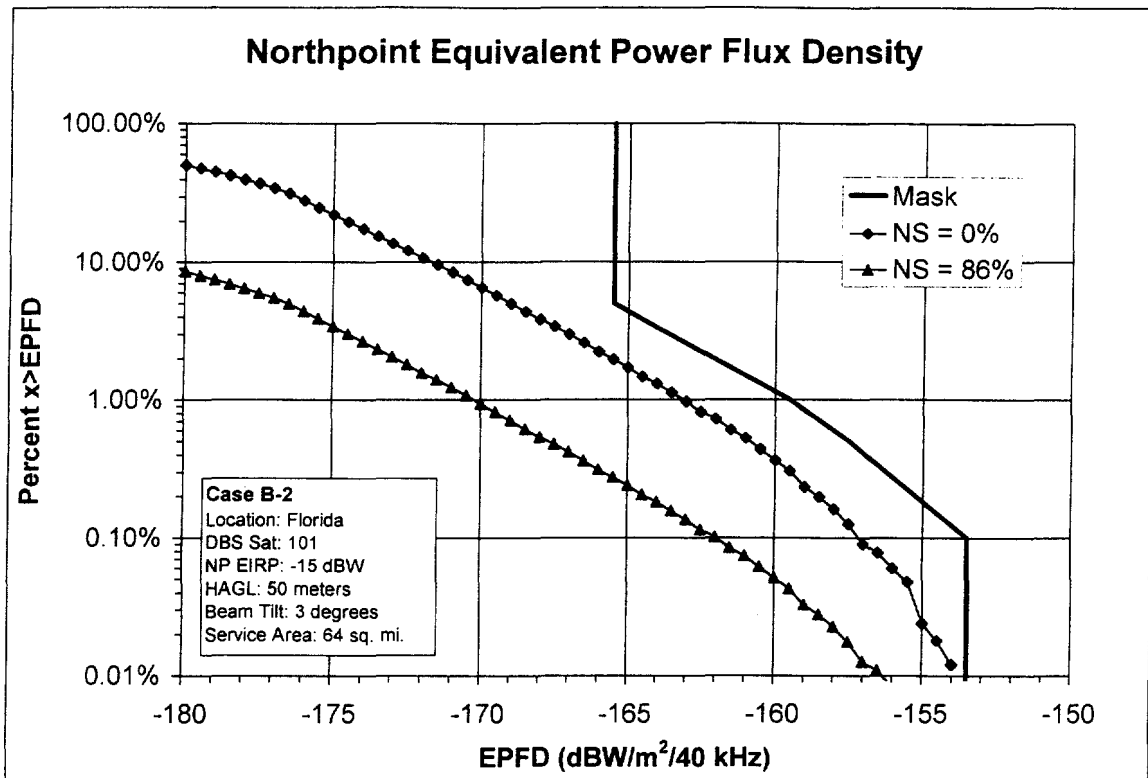
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<sup>1</sup> This is the level of natural shielding found in a national survey of 400 DBS dish owners conducted by the survey firm of Bennett, Pettis and Blumenthal, submitted to the FCC in July 1999.

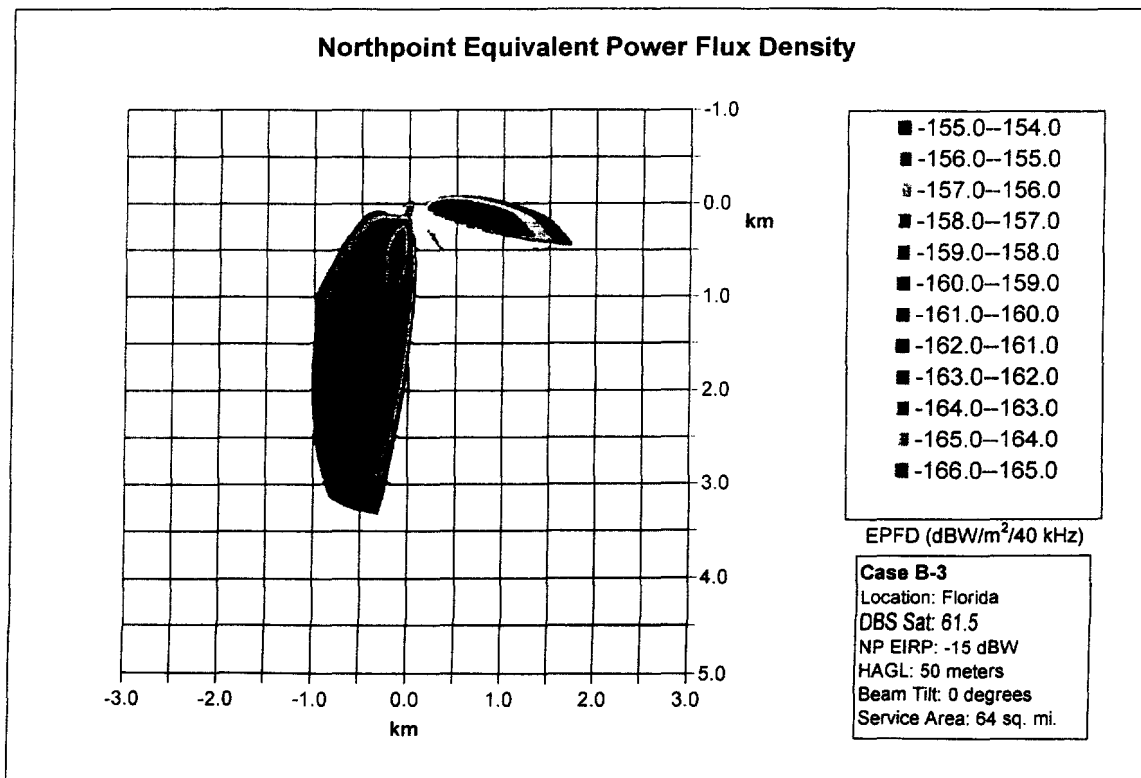
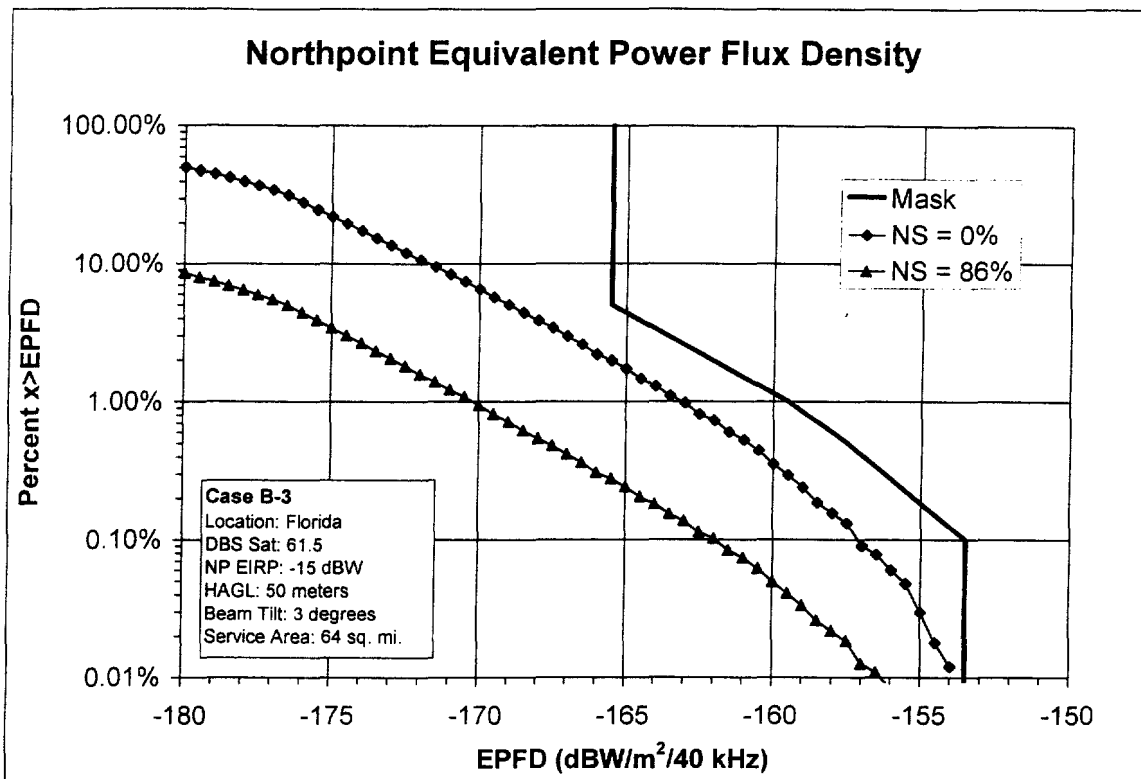
## Appendix 2



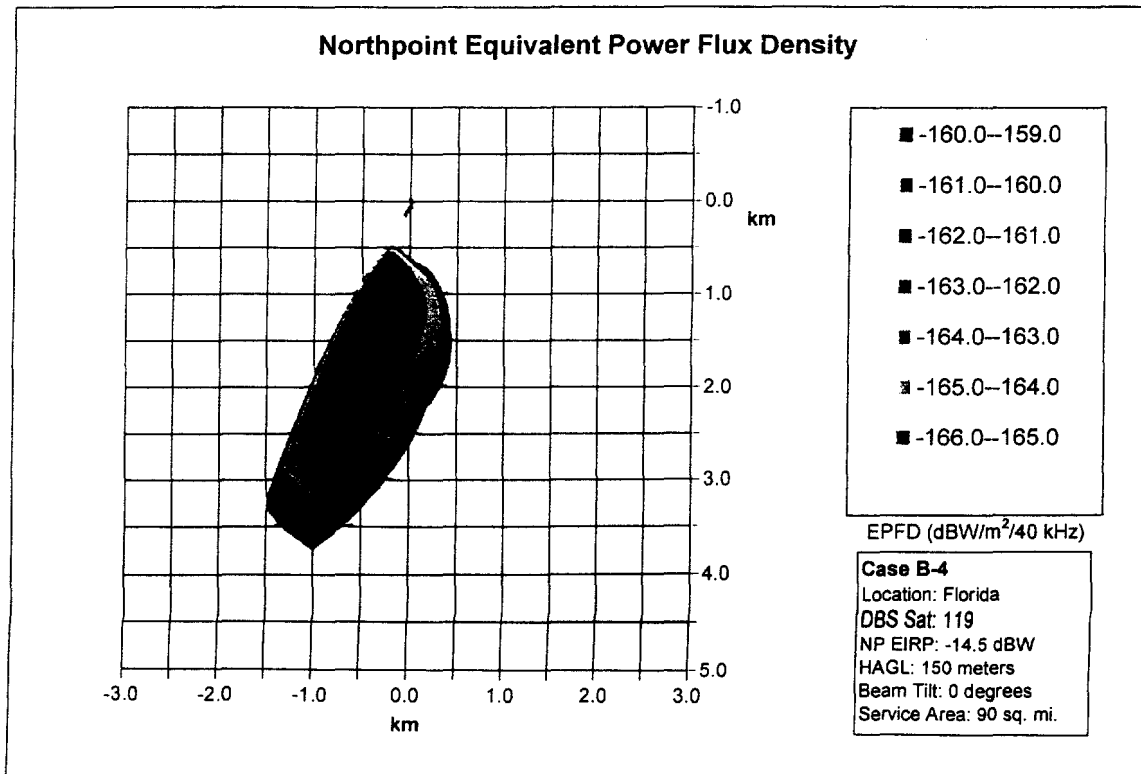
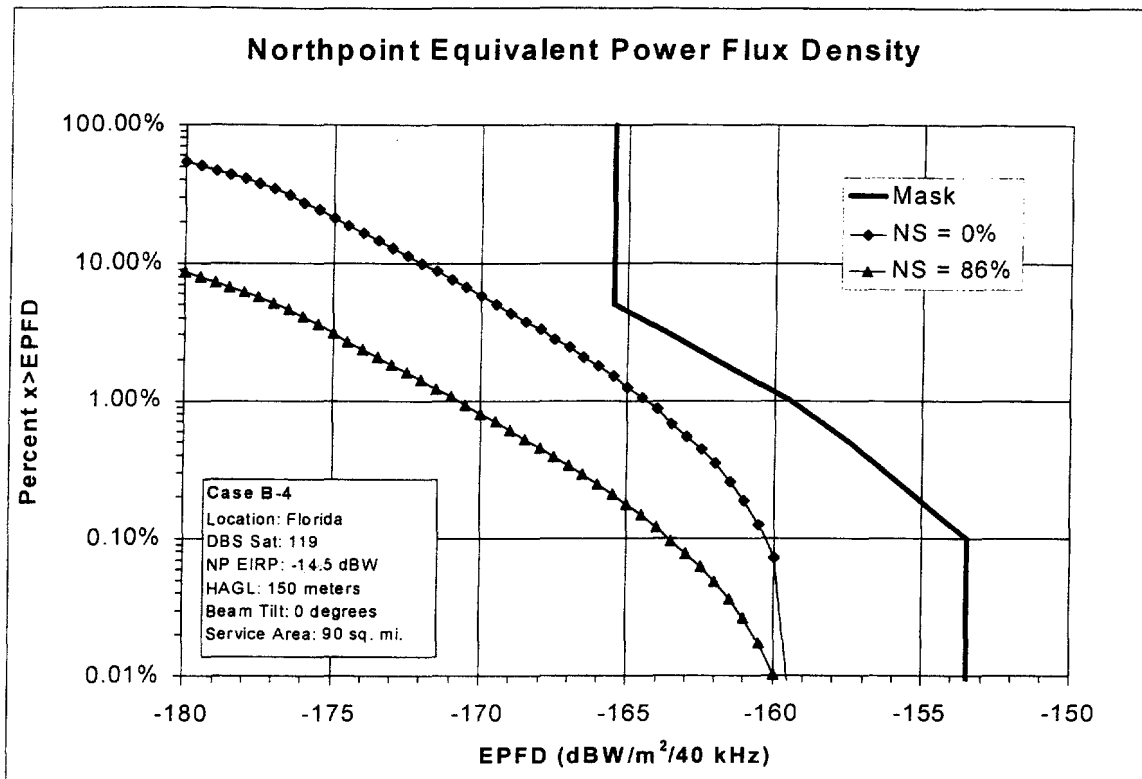
## Appendix 2



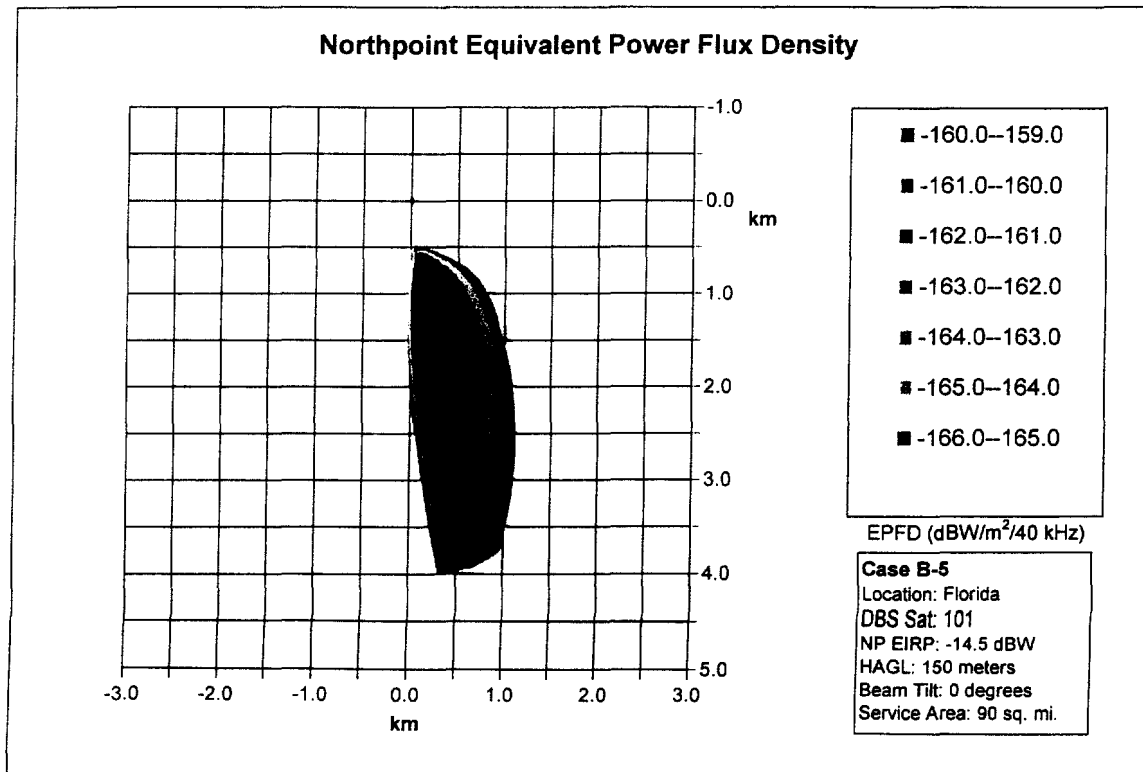
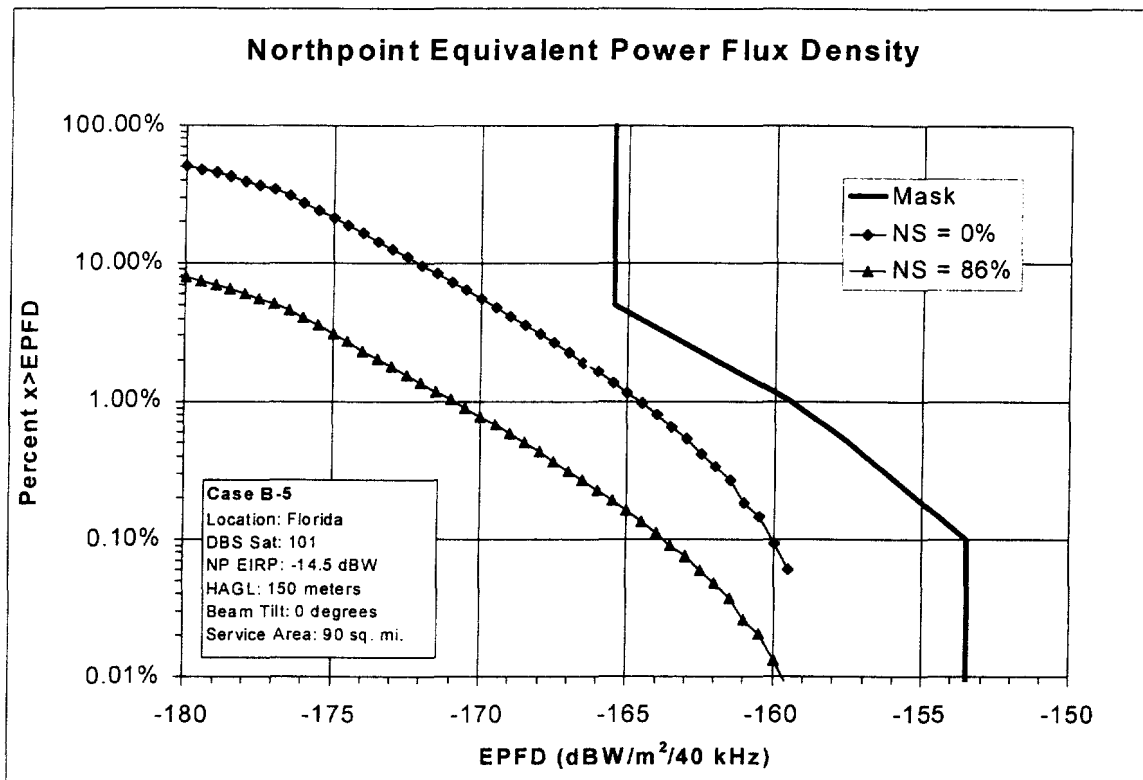
## Appendix 2



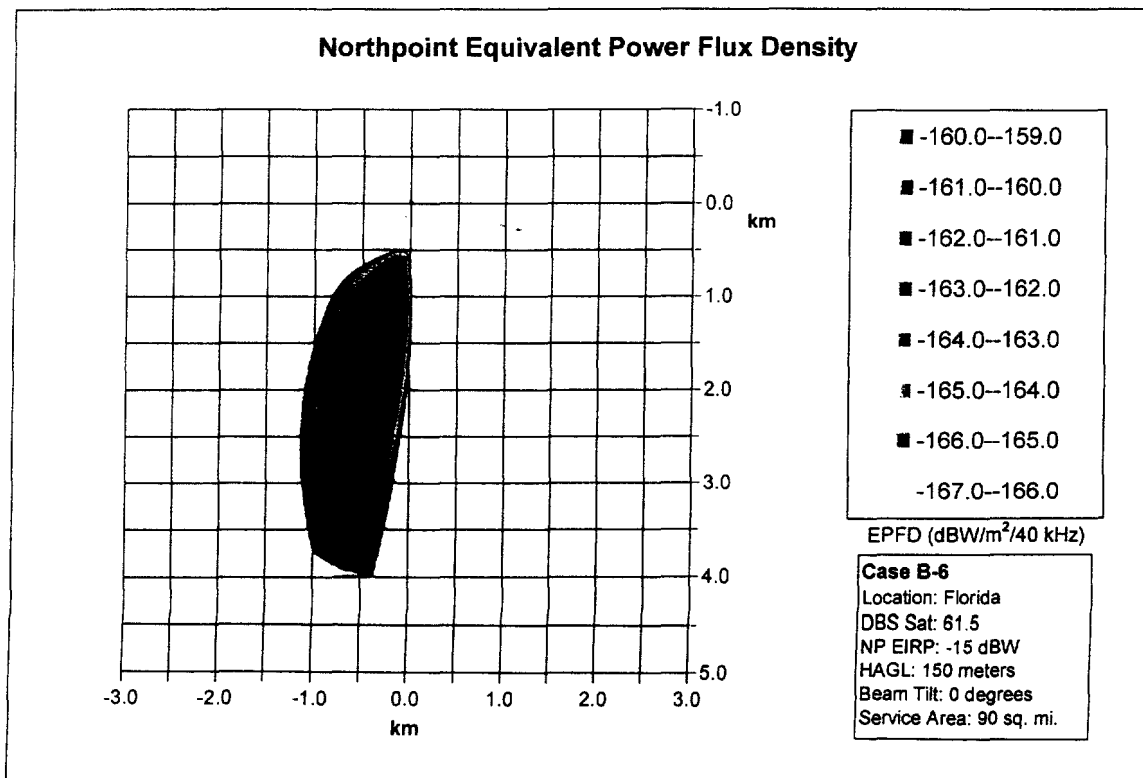
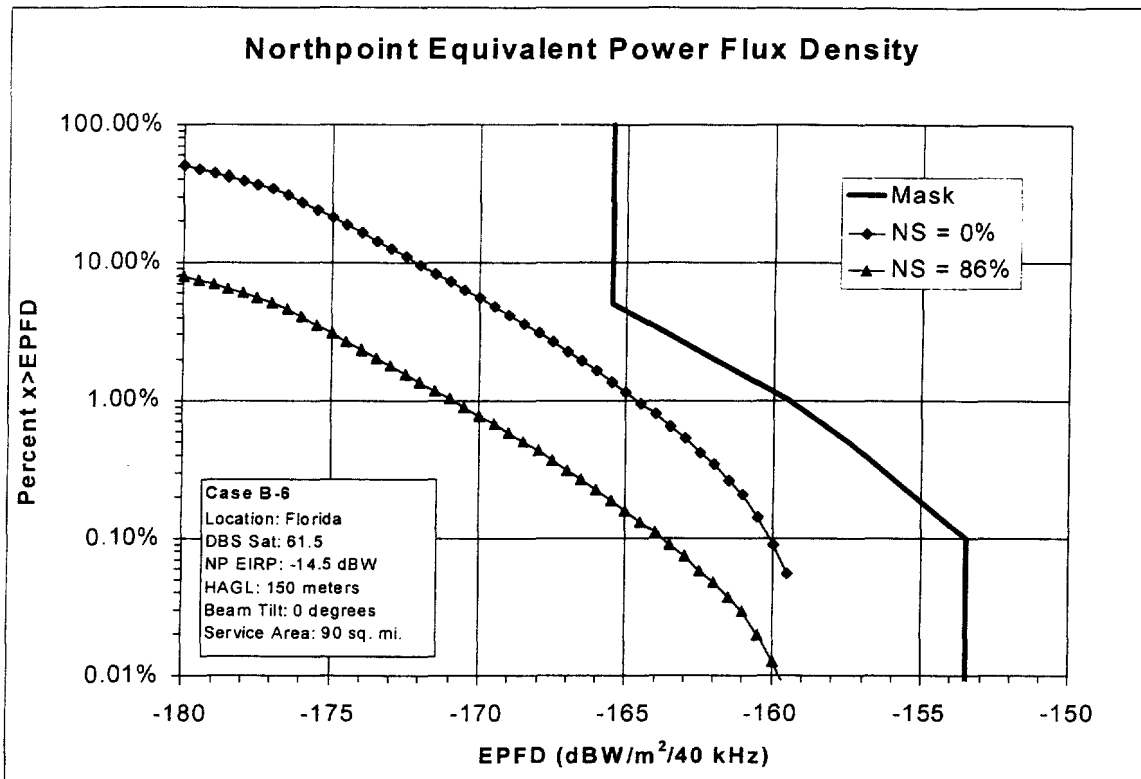
## Appendix 2



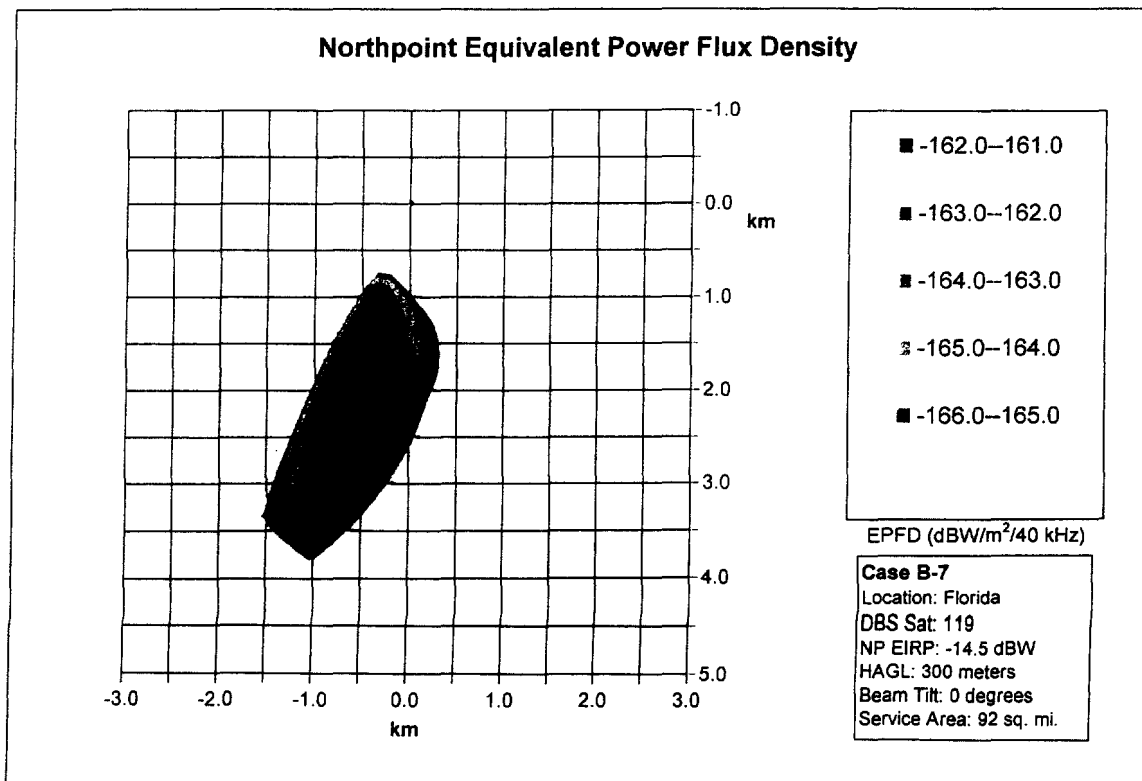
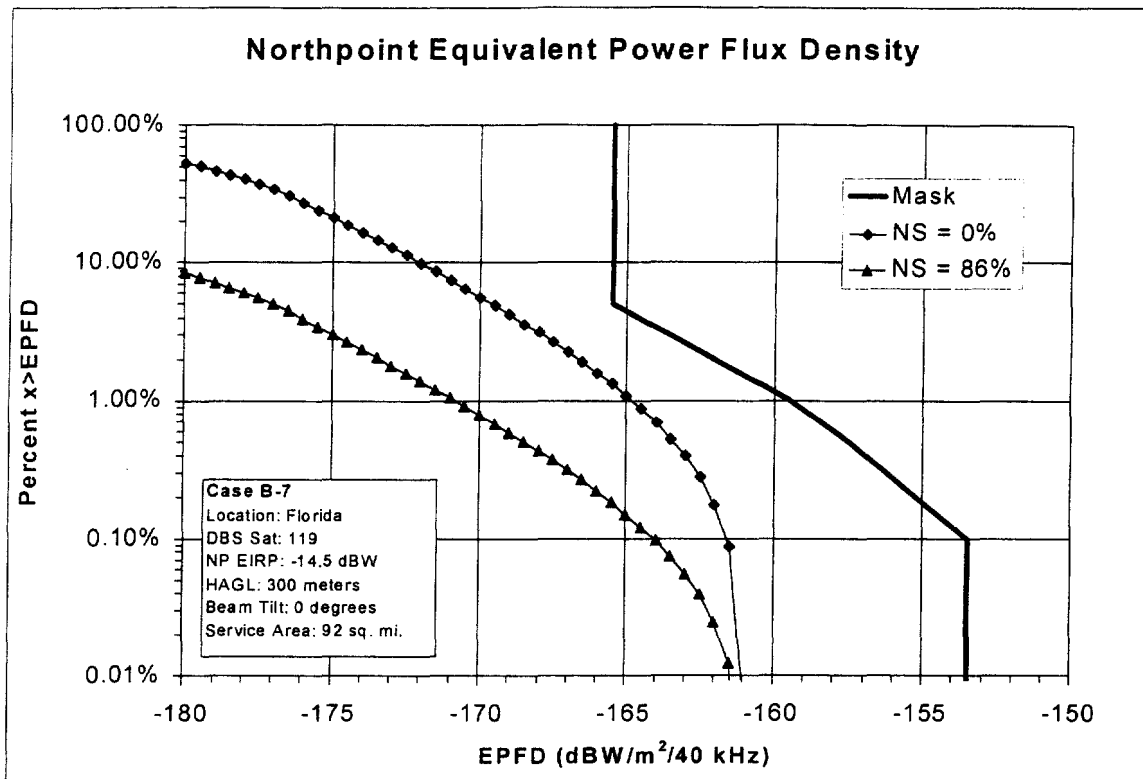
## Appendix 2



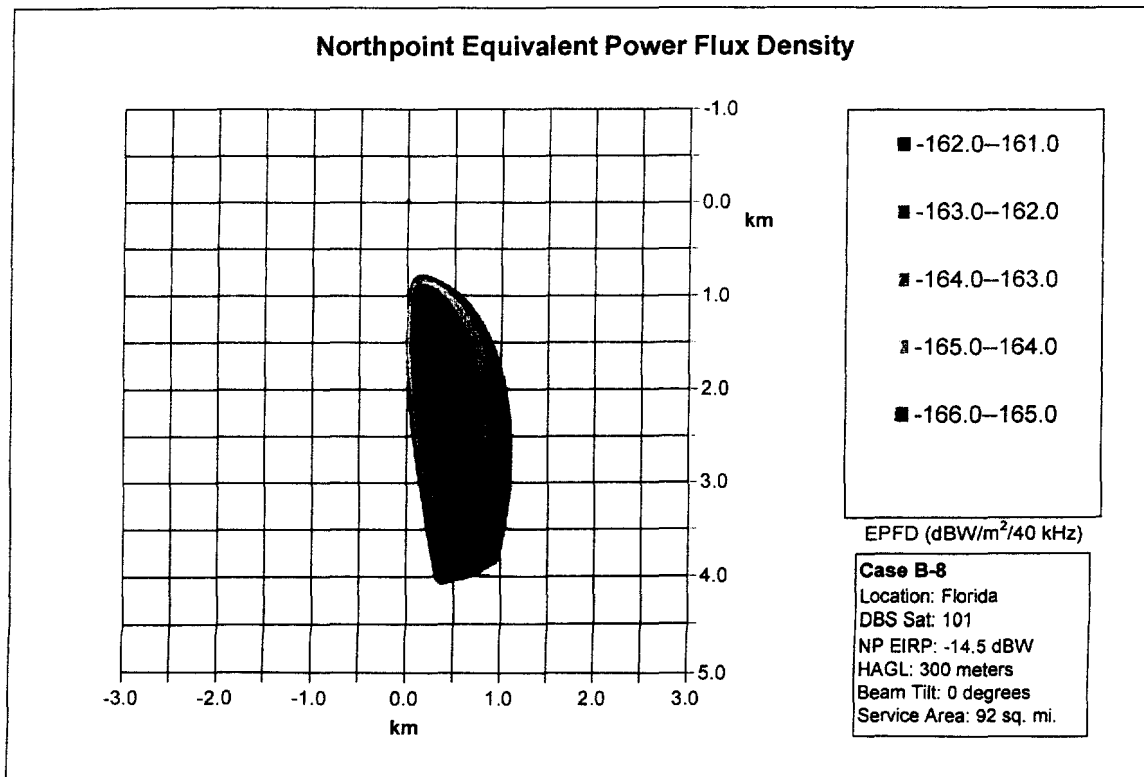
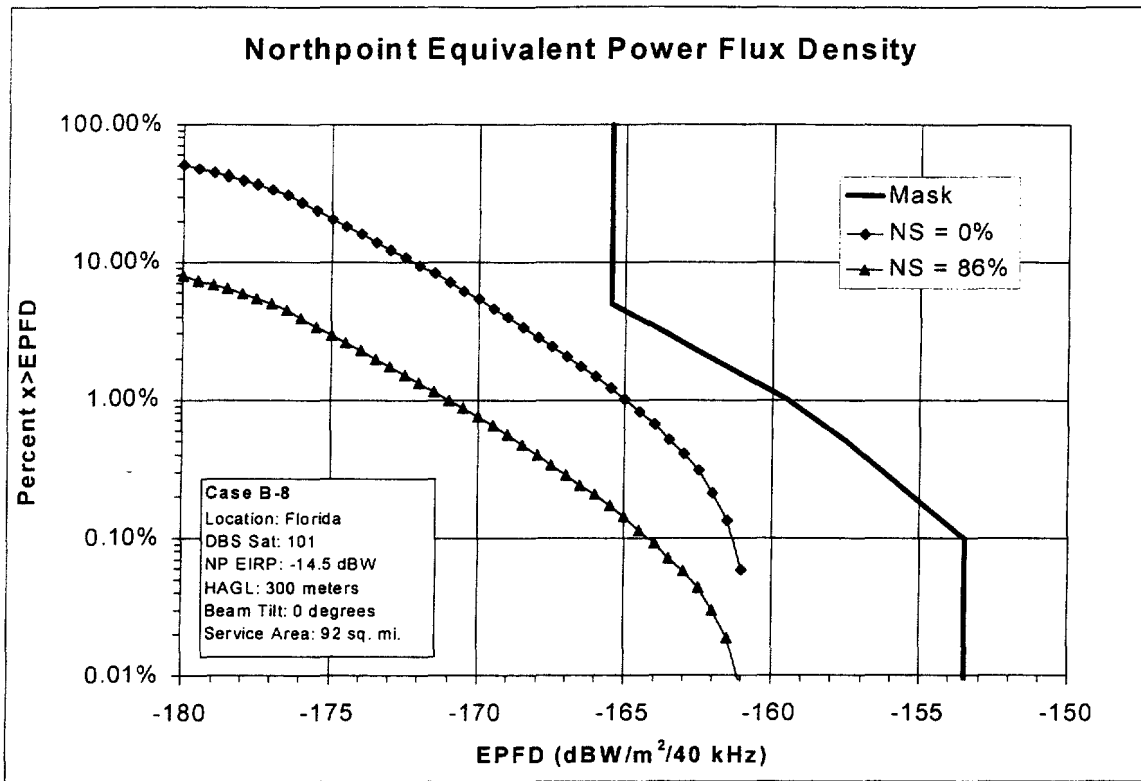
## Appendix 2



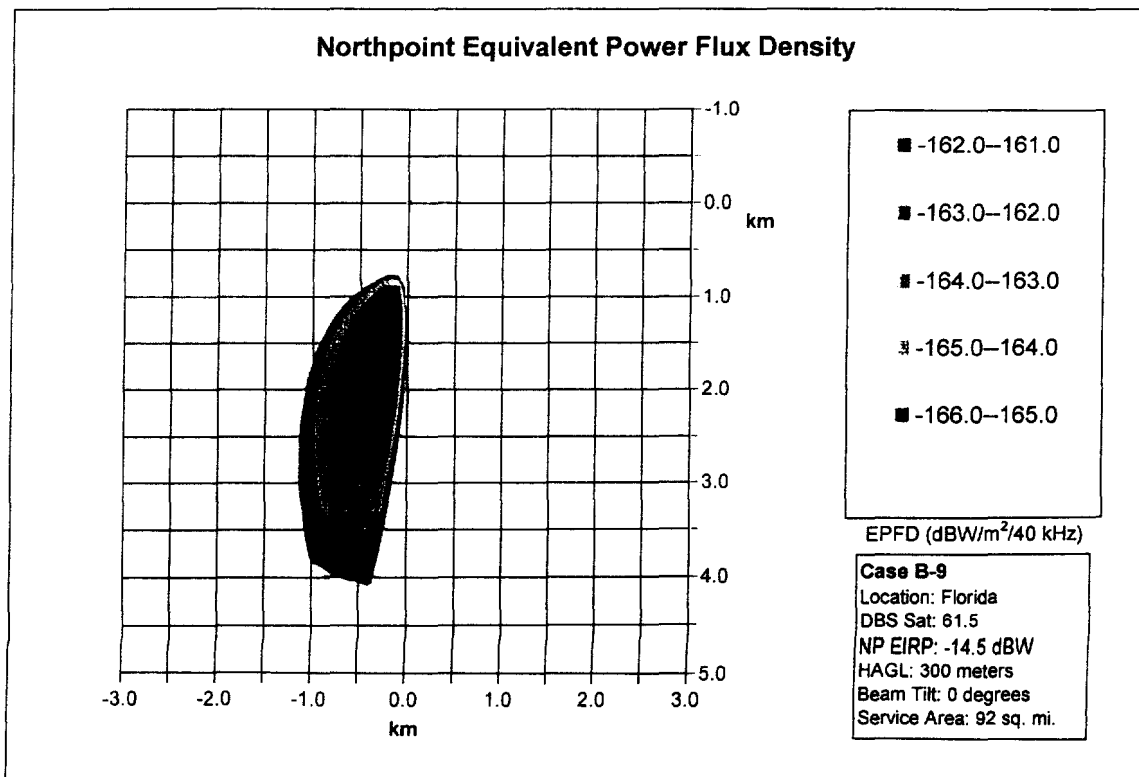
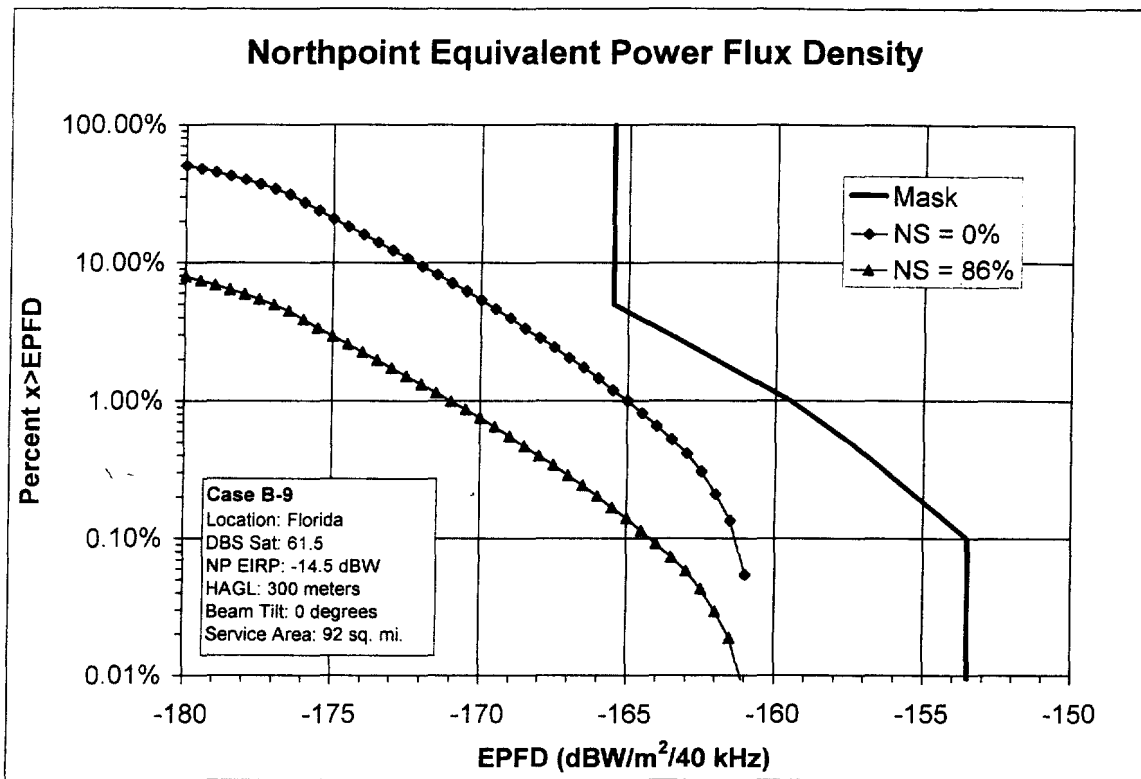
## Appendix 2



## Appendix 2



# Appendix 2



March 28, 2000

**VIA HAND DELIVERY**

Ms. Magalie Roman Salas  
Secretary  
Federal Communications Commission  
The Portals  
445 12<sup>th</sup> Street, S.W.  
12<sup>th</sup> Street Lobby, Counter TW-A325  
Washington, D.C. 20554

Re: *Ex Parte* Submission of Northpoint Technology, Inc.  
ET Docket No. 98-206; RM-9147; RM-9245

Dear Ms. Salas:

In recent filings, both Boeing and Skybridge have asserted that the Northpoint system will create exclusion zones around the Northpoint transmitter where neither Boeing nor Skybridge can operate their NGSO FSS systems.<sup>1</sup> Boeing has estimated the exclusion zone to be equal to approximately 3.5% of the Northpoint service area and the Skybridge exclusion zone is estimated to be approximately 10% of the Northpoint service area.<sup>2</sup> Both Boeing and Skybridge further assert that if such exclusion zones exist, they would reduce the capacity of their systems, making them unviable. For this reason Boeing and Skybridge say the Northpoint system should not be allowed to be deployed.<sup>3</sup> As previously stated, Northpoint disagrees with the assertions of Boeing and Skybridge. Northpoint filings in ET Docket No. 98-206 have demonstrated that mitigation

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<sup>1</sup> See "Written *Ex Parte* Communication in ET Docket No. 98-206", ("Skybridge Letter"), Attorneys for Skybridge, February 18, 2000, pp 24-25 of attached Annex, and also see *ex parte* letter to William E. Kennard, ("Boeing Letter"), dated February 16, 1999, (received by the Commission February 16, 2000), page 2.

<sup>2</sup> Boeing estimates the size of a mitigation zone as up to 3 km, equal to 3.5% of the Northpoint service area, Boeing Feb. 16 Letter, page 3. Skybridge offers no detailed analysis of its own, and it does not dispute Northpoint's showing that for a typical Northpoint deployment an exclusion zone of less than 10% of the Northpoint service area would exist if Skybridge did not employ mitigation techniques as recommended by Northpoint, see Comments of Northpoint Technology, March 2, 1999.

<sup>3</sup> See Boeing Letter page 3, Skybridge Letter page 26.

techniques exist which will allow both Boeing and Skybridge to operate without undue burden within the region immediately surrounding the Northpoint transmitter.<sup>4</sup>

However, even if the Boeing and Skybridge assertions were true, this letter provides a new analysis, which demonstrates that the lack of access to the service area immediately surrounding the Northpoint transmitter would not inhibit the deployment of the Boeing or Skybridge NGSO FSS systems or prevent either system from selling 100% of its service capacity.<sup>5</sup> As the following analysis demonstrates, the Boeing and Skybridge systems together offer the capacity to serve only a maximum of 5.4% of U.S. households at their full satellite capacity. Since the forecast Boeing and Skybridge exclusion zones (resulting from non-implementation of mitigation techniques) is estimated to equal 3.5 – 10% of the Northpoint service area, it should be clear that Boeing and Skybridge will still have 90 – 96.5% of the service area available to them in which to locate the 5.4% of customers that these systems have the capacity to actually serve.<sup>6</sup> Thus they should not be inhibited from deployment by the presence of any exclusion zones that may result from non-implementation of mitigation techniques.

An examination of these numbers should also make it clear that a far more important question for the Commission is not the self interest of The Boeing Company or Skybridge who reasonably seek to sell all of their satellite capacity, but the issue of how the other 94.6% of U.S. households will gain the benefit of competitive services in the 12.2 – 12.7 GHz band. Since neither Boeing nor Skybridge have the capacity to serve these Americans, it is vital that the Commission makes sure that other digital service providers such as Northpoint can address this enormous void.

Sincerely yours,



Sophia Collier  
President

---

<sup>4</sup> See Comments of Northpoint Technology in ET Docket No. 98-206, March 2, 1999. *et. al.*

<sup>5</sup> This is true even if Boeing and Skybridge choose not to implement any of the proposed mitigation techniques suggested by Northpoint.

<sup>6</sup> It should also be noted that in all cases both Boeing and Skybridge will have 100% of the service area within the lower 11.7 – 12.2 GHz band available to them.

**Northpoint Technology**  
**Analysis of Satellite Capacity and Un-Served Population**  
**Full Discussion**

*Limitations of the NGSO FSS system capacity*

Every communication system has a limited system capacity. Skybridge, for example, has estimated that its system can serve 20 million customers<sup>7</sup> on a worldwide basis, of which approximately 3 – 5 million customers would be within the United States. This represents service to 1 – 2% of the U.S. population with an average throughput per customer of 11 kilobits per second of forward capacity.<sup>8</sup> Similarly, Boeing will have less than 500 megabits per second capacity in the United States,<sup>9</sup> with which it can serve approximately 500,000 customers.<sup>10</sup> Accordingly, together Skybridge and Boeing can serve a maximum of only 5.5 million customers in the United States or less than 5.4% of the U.S. households.<sup>11</sup>

*Distance Insensitivity of NGSO FSS systems*

In previous filings NGSO system operators have made the statement that their systems are distance insensitive and can serve one point within the United States as easily as any other point. Skybridge has gone so far as to state that it can serve a townhouse as easily as a farmhouse.<sup>12</sup> Considering the distance insensitivity and low capacity of these systems together, it becomes clear the claimed exclusion zones that may result (if Boeing or Skybridge do not implement mitigation techniques) will not prevent these NGSO FSS systems from reaching their maximum capacity.

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<sup>7</sup> See Northpoint *ex parte* filing January 6, 2000, page 2

<sup>8</sup> Skybridge asserts a global aggregate throughput of 215 Gbps, with 20 million customers. The average throughput per customer is equal to 215 Gbps /20 million customers, or 11,000 bits per second per customer.

<sup>9</sup> See Northpoint Response to Boeing Letter March 22, 2000, page 20.

<sup>10</sup> Boeing states it can serve 96 simultaneous users per 166 MHz signal, Boeing Filing page 33. With two carriers and two polarizations in every beam footprint, the total number of users per beam footprint is 400. Twelve beam footprints cover the U.S., see Northpoint letter dated March 22, 2000, for a total of 4,800 simultaneous customers active at any time in the U.S. Even assuming only 1% of Boeing customers are active at any time, the total number of customers would be 480,000 in the United States.

<sup>11</sup> Current figures from the U.S. Census Bureau estimate that there are approximately 101 million households in the United States

<sup>12</sup> Skybridge Letter, page 3.

*Exclusion zones would not eliminate market opportunities for NGOS FSS Systems*

The United States has over 3.5 million square miles of surface area that is home to over 261 million Americans according to the United States Census Bureau, aggregated into approximately 101 million households, residing in the over 3.5 million square miles that comprise the United States.<sup>13</sup> The average population density is therefore 29 households per square mile. Boeing has estimated the exclusion zone to be equal to approximately 3.5% of the Northpoint service area and the Skybridge exclusion zone is estimated to be approximately 10% of the Northpoint service area. This means that Boeing and Skybridge will still have 90 – 96.5% of the service area available to them in the 12.2 – 12.7 GHz band (as well as 100% of the service area within the lower 11.7 – 12.2 GHz band.)

As shown on the attached Table 1, even if Boeing and Skybridge were unwilling or unable to employ any interference mitigation techniques in the claimed exclusion zone, the Boeing and Skybridge NGSO FSS systems would still have available to them territory and potential customers that exceed their combined service capacity by at least 16.5 times. For each individual system, the numbers are even more significant. After accounting for its claimed exclusion zone, Skybridge will have territory and potential customers available to it in an amount that its service capacity by 19.5 times and Boeing's opportunity will exceed its capacity by 195 times. Clearly the exclusions zones claimed by these NGSO FSS operators will not inhibit the planned systems ability to sell 100% of these systems available satellite capacity.

**Table 1: Comparison of Boeing and Skybridge Service Capacity In the Event of Exclusion Zones Caused by Inability to Implement Mitigation Techniques**

	Skybridge	Boeing	Combined
U.S. Population	263,717,010	263,717,010	263,717,010
U.S. Households	101,041,000	101,041,000	101,041,000
U.S. Square Miles	3,536,339	3,536,339	3,536,339
Size of possible exclusion zone	10.0%	3.5%	10.0%
Remaining available territory	90.00%	96.50%	90.00%
Size of available territory (sq. mi.)	3,182,705	3,412,567	3,182,705
Available Population	90,936,900	97,504,565	90,936,900
Maximum customers possible for satellite capacity available	5,000,000	500,000	5,500,000
Factor by which population outside of exclusion zone exceeds satellite capacity	18.2x	195x	16.5x
% of U.S households served	4.95%	0.49%	5.44%
% of U.S. households un-served	95.05%	99.51%	94.56%

<sup>13</sup> See <http://www.census.gov/population/estimates/housing/sthuhh1.txt> , visited March 27, 2000.

In summary, both Boeing and Skybridge assert the existence of exclusion zones. As demonstrated by Northpoint in this proceeding, mitigation techniques exist to eliminate these exclusion zones. However, even if Boeing and Skybridge do not use any mitigation techniques, and therefore allowing exclusion zones to exist, this would not impact NGSO service capacity. The population in the territories outside of the exclusion zones far exceeds both system's satellite capacity by a significant factor. Therefore, the Boeing and Skybridge claims that their systems would suffer loss capacity due to the deployment of Northpoint are shown to be untrue.

**FILE COPY**

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July 6, 2000

Ms. Magalie Roman Salas, Secretary  
Federal Communications Commission  
The Portals, 445 12<sup>th</sup> Street, S.W.  
Counter TW-A325  
Washington, D.C. 20554

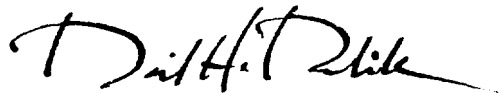
Re: ***Ex Parte Submission of Northpoint Technology, Ltd.***  
**ET Docket No. 98-206, RM-9147, RM-9245**

Dear Ms. Salas:

This letter is written to notify you that on July 6, 2000, Robert Combs, Director, System Development of Northpoint Technology, Ltd. and BroadwaveUSA, wrote to Michael J. Marcus of the Commission's Office of Engineering and Technology regarding methods to improve isolation for Direct Broadcast Satellite Service receive antennas. Copies of Mr. Comb's letter are enclosed with this notification.

An original and six copies of this letter are submitted for inclusion in the public record for the above-captioned proceedings. Please direct any questions concerning this submission to the undersigned.

Sincerely,



David H. Pawlik  
Counsel for Northpoint Technology, Ltd.  
and BroadwaveUSA

# BroadwaveUSA™

Creating Cable Competition with Northpoint Technology

400 N. Capitol Street, N.W., Suite 368  
Washington D.C. 20001  
(202) 737-5711

July 6, 2000

Mr. Michael J. Marcus  
FCC/OET  
445 12<sup>th</sup> St. S.W.  
Washington D.C. 20554

Dear Mr. Marcus,

This letter responds to your question regarding methods to improve isolation for the standard 18" DBS offset feed antenna ("DBS Receive Antenna"). The DBS Receive Antenna has spillover lobes (the so-called "butterfly" lobes) from the LNB feed, which occur at approximately 130 degrees off bore sight. It is possible (in rare instances) that a configuration might occur that causes an emitter (whether terrestrial or satellite) to be seen in the spillover lobe, which would cause signals to be input to the receiving system at about -2 dBi. In such cases, an increase in the carrier to interference (C/I) ratio would improve the signal quality. To achieve this improvement, the DBS Receive Antenna can be shielded or relocated to a position where natural shielding will provide additional isolation.<sup>1</sup> Should these options prove impractical, other options exist.

For example, replacement of the original antenna with a planar array antenna would provide over 10 dB of additional isolation. Such antennas are available with dual LNB reception capability. Other alternatives include replacement of the customer antenna with a higher gain antenna, which would improve both the carrier strength and the C/I ratio, or to use additional shielding at the customer antenna.<sup>2</sup> The isolation improvement from the various methods is listed in the following table:

Method	C/I Ratio Improvement
Relocation of customer antenna	3-20 dB
Replacement with planar array	10-12 dB
Replacement with higher gain offset feed antenna	3-10 dB
Addition of localized shielding	6-20 dB

<sup>1</sup> For example, one inch of concrete typically would provide over 10 dB of isolation.

<sup>2</sup> This concept was validated during the Northpoint - DBS compatibility tests in Austin, Texas. See Progress Report WA2XMY Northpoint - DBS Compatibility Tests, Diversified Communications Engineering, Inc., December 1998, page 21.

Mr. Michael J. Marcus  
FCC/OET  
July 6, 2000  
Page 2

In summary, as demonstrated in the record in ET Docket 98-206, the rare case may occur where there is an alignment of an emitter with the spillover lobe on the DBS antenna. However, sufficient low-cost methods exist to improve the isolation or C/I ratio in these circumstances by 10 to 20 dB or more. Some of these methods may be used jointly. In this case, the isolation is additive. If there are any questions or comments, please contact the undersigned.



Robert Combs  
Director, System Development